

April 2021

President Emeritus - Tom Scorone, KC2FCP President - Bryan Jackson, W2RBJ Vice-President - Nick Field, KD2JCR
Secretary - Steve VanSickle, WB2HPR Treasurer, Don Mayotte, KB2CDX
Board Members: David Jaegar, Jr., K2DEJ Russ Greenman, WB2LXC Dave Gillette, KC2RPU

Getting Back to *Normal* with In-Person Meetings

After more than a year of “virtual” meetings because of the pandemic, EGARA plans to resume in-person meetings on Wednesday, April 14th at the Masonic Lodge. Club officers have determined that in-person meetings can be held safely by observing standard precautions of social distancing, requiring face masks, use of hand sanitizer and temperature checks. Members will also be asked by email prior to the meeting to indicate if they will attend and if they have received a Covid vaccine shot.

“It’s been a long haul for groups like ours, but we think using common sense precautions will make it possible to get back to some semblance of normal,” said EGARA President Bryan Jackson, W2RBJ. “Fortunately, many of our members have also now received their Covid vaccine shots, providing an additional measure of safety and confidence.”



As an additional precaution, the April meeting will not offer the usual pizza or refreshments. However, members will be able to bring along their own drinks and snacks if they wish. They may also wish to wear a sweater or coat during the meeting, as it is expected that the windows in the meeting room will be opened to provide extra air circulation and ventilation.

One of the benefits of being able to resume in-person meetings will be the ability to offer training sessions and presentations. For the April event, a presentation on the use of Raspberry Pi computers in Amateur Radio will be made by Club Treasurer Don Mayotte, KB2CDX.

The meeting agenda will also include discussions on Field Day and Hamfest preparations.

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Club Receives First Tax Deductible Donations

EGARA has received its first donations since being designated as a 501(C)3 charity by the IRS. Under that declaration, donations to the club are now tax deductible.

The first was given by William Hudzik, W2UDT, who serves as Vice Director of ARRL’s Hudson Division. The second was received from club member Vince Gizzi, KC2USV, who sent a donation along with his annual club dues. A third came from member Bud Shepard, W2BUD. All were gratefully acknowledged by the club, which provided documentation for their tax records.



In addition to cash contributions, tax deductible donations to the club can include equipment and in-kind services, both of which can be deducted for their fair market value.

Next Membership Meeting - April 14, 2021 - Masonic Lodge at 7 pm

Hamfest 2021 -- It's on the Calendar!

Mark the date -- August 28th!

EGARA has set the wheels in motion for Hamfest 2021 after having to cancel last year's event because of the pandemic. By the late summer date, it's expected that most of those attending will have received their Covid vaccinations and that the pandemic itself will be well under control. However, the club will observe whatever precautions may be recommended by health professionals at that time.

The club's 2021 Hamfest has already been approved by ARRL and will be a fully sanctioned League event. That also means that the League will be providing the club with ARRL gift certificates, as it has done in the past. Vendors are also being made aware of the date and invited to attend. One mainstay -- KJI Electronics -- has already committed to being in attendance, and will once again be offering a wide variety of radios and accessories. With the cancellation of the Dayton Hamfest again this year, it's hoped that additional vendors will take advantage of EGARA's event in August. Sponsors who committed to supporting the club last year will continue to be recognized as part of Hamfest 2021.

Because last year's Hamfest had to be canceled, the club already has a good stock of prizes on hand, including a number of top line Wouxun radios and gear that were provided by the company as the major sponsor. Those items were placed in storage in anticipation of the club's Hamfest getting back in business this year. The club had also purchased an HF mobile rig as the traditional Grand Prize, along with tri-band HT radios which will be raffled. Prizes will total over \$3,500!

Planning for this year's Hamfest has already begun and members will be asked to sign up for work assignments. Jobs will include staffing the admission gate, parking coordination, kitchen and food preparation, raffle sales and general help assisting guests and vendors. Planning will be a main topic of discussion during the club's upcoming events, starting with the April membership meeting.

Please Support Our EGARA 2021 Hamfest Sponsors

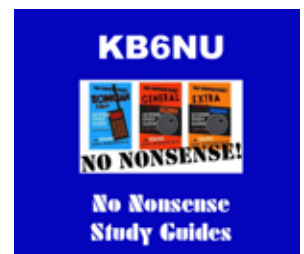


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A Bat Phone for Your Shack

Remember that red Bat Phone that would summon Batman for help? Now you can get one for your Hamshack -- except it's not really a Bat Phone. It's just the name hams are giving it as they add this handy accessory to their shack.

In reality it's a Hamshack Hotline and it uses the Internet to connect hams on the system all over the world. Best of all, it's free to call! Your only expense is a low-cost VOIP (Voice Over Internet Protocol) phone which can be purchased for around \$20. Several EGARA members have already jumped on board.

The phone itself is connected to your home's Internet and is assigned a unique number by the volunteers who run and maintain the Hamshack Hotline service -- also known as "HH". Inexpensive Cisco phones are supported by the service and can be purchased refurbished for as little as \$20. In addition to regular calling, Hamshack Hotline offers conference calling, voice messaging and the ability to bridge club members together for voice mail announcements.

After acquiring a suitable phone (as listed on the Hamshack Hotline website), a new user simply sets up a free account and logs in to open a service ticket. Here the user enters information about their phone (type and model), as well as the phone's unique MAC address, which is listed on the phone itself. Usually within a day or two, the new user will get a return email with their new Hamshack Hotline phone number and instructions on how to "provision" their phone so it works on the system. The process is not hard and can be done in just a couple of minutes, thanks to custom program scripts that a user can cut and paste into a browser on their computer to program their phone. The "HH" website -- <https://hamshackhotline.com> -- also has a help page and FAQs to guide users through the process and to answer common questions.

According to the Hamshack Hotline website, the goal of HH is not to replace traffic carried over radio in an emergency or other tactical operation, but rather to augment it, by offloading managerial tactical operations and providing a full duplex path for such communications when spectrum is occupied, conditions diminished, or otherwise unavailable. In addition to all this, conference bridges on the HH network allow large groups of Hams to coordinate & meet in anywhere in the world.

HH users will find a complete searchable directory of other hams on the system by visiting the HH website (click the "Documents" drop down then "Phonebook"). There's also a list of "bridges" that allow users to join conference calls or monitor services. For example, EGARA's bridge is 1420.

While Hamshack Hotline is a completely free service and run by an all volunteer staff, it gratefully accepts donations to help defray its operating costs. A donate button can be found on the HH website and donations can be either one-time or set up as recurring monthly donations. EGARA members who are interested in purchasing a low-cost compatible VOIP phone for Hamshack Hotline can contact club member Dave Smith, WA2WAP, by email at: wa2wap@verizon.net or by phone at: (518) 438-1016. He offers refurbished phones that are pre-programmed with the HH numbers of club members on the system.



A \$20 Cisco VOIP phone will get you connected to Hamshack Hotline

EGARA Welcomes Two New Members!

Two newly licensed Hams have become EGARA's latest members. John Fisher, KD2WAA and Edward Bell, KE2EEB. both of Troy, recently passed their Technician exams and had their calls assigned by the FCC in March.

They expect to be in attendance at the club's April meeting, so please give them a warm welcome and lend a hand answering their questions about Amateur Radio, antennas, gear and operating tips. Their addition to the club's roster brings the total membership to 61.

EGARA Club Elections Set for April



April will bring with it the annual EGARA elections, with votes being cast for all of the club's officers and board members.

All members who are in good standing with annual dues paid will be eligible to vote. In addition, they may be nominated for any of the open positions.

All of the incumbent officers and board will be on the slate of candidates seeking re-election. They include the following incumbents:

- For President: Bryan Jackson, W2RBJ
- For Vice President: Nick Field, KD2JCR
- For Secretary: Steve Vansickle, WB2HPR
- For Treasurer: Don Mayotte, KB2CDX
- For Board: Russ Greenman, WB2LXC; David Jaegar, Jr., K2DEJ; and Dave Gillette, KC2RPU
- Also running for a seat on the Board of Directors will be Tom Scorsone, KC2FCP and Ridge MacDonald, KB2HWL.

Board positions are normally a three-year term. However, the membership voted to stagger the board positions so one board position is open every year. To accomplish this, the names of the three winning board members will be placed into a drawing for a one-year and a two-year term. These positions will return to full three-year terms with subsequent elections, resulting in the staggered election of the board members in the future. If the three board members agree among themselves as to who will serve in each of the one, two and three year terms, the drawing will not be necessary.

Anyone wishing to run for an office should notify club Secretary Steve VanSickle no later than April 12th by email at: svansick@nycap.rr.com so they can be placed on the ballot.

Nomination will also be accepted from the floor during the April 14th meeting, and will be added to the ballot as write-in candidates. Members are urged to make sure they have their dues up to date so that they may participate in the club election.

Still Need to Pay Your 2021 Club Dues? It's Never Been Easier!

Take a moment right now to support EGARA by sending along your annual dues for 2021.

Pay quickly and easily online at: <https://www.egara.club/pay-dues>

or mail your check to: EGARA, P.O. Box 25, East Greenbush, NY 12061.

\$15 / individual - \$25 / family

Multi-year rates also available. Check the website for details.

On the Beam

News & Notes

EGARA Goes 'Round the World

On March 17th, EGARAs "New Ham Kit" was the subject of a presentation to the Denny Dale Amateur Radio Club in Yorkshire, England. The program was held via a Zoom meeting and the presentation was made by EGARAs President Bryan Jackson, W2RBJ.

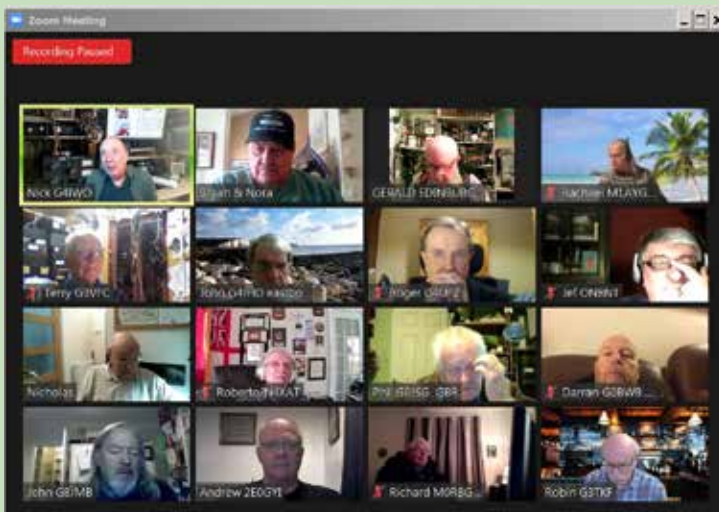
The invitation to address the U.K. club was extended as a result of the article that was published in the February issue of QST magazine by the ARRL.

"While the article was aimed at domestic ham clubs, it turned out to be of interest to Amateur Radio groups all over the world," Jackson said.

"It's clearly a common thread that many newly licensed hams need help and guidance in getting on the air -- whether they live here in the states, Canada, the U.K. or down under in Australia."

Jackson said that he received dozens of inquiries from other clubs about EGARAs kit, with most asking for additional information and assistance in creating one of their own version to give to new hams. To aid those requests, a PDF version of the kit was posted on the club's website for easy downloading.

"It's gratifying to know that our club has been able to help so many others in getting new hams on the air," Jackson continued. "And they've offered to recognize EGARAs assistance in helping them produce their own materials."



Members of the Denny Dale Amateur Radio Club in Yorkshire, England watch as EGARAs President Bryan Jackson discusses EGARAs "New Ham Kit" during their Zoom meeting

New FCC License Fee Not Being Collected... Yet



The FCC says it will announce its ruling on new licensing fees on April 19th -- including when it will start charging \$35 for Amateur Radio licenses. The FCC said the fees will not go into effect until, "requisite notice has been provided to Congress, (and) the FCC's information technology systems and internal procedures have been updated, and the Commission publishes notice(s) in the Federal Register announcing the effective date of such rules."

Originally, the FCC had proposed charging Amateur Radio operators a \$50 fee, but reduced the amount after receiving a large number of objections, with ARRL leading the fight. The biggest concern was that a \$50 fee would discourage people from pursuing a ham operator license, as well as some hams choosing not to renew their tickets. Other arguments included Amateur Radio's service to the community, its assistance during emergencies, and that the current licensing system is highly automated. For example, Volunteer Examiners (VE) now do the license exam work previously handled by the FCC. As a result, the Commission agreed to drop the fee to \$35.

In addition to Amateur Radio license holders, the FCC will be imposing new licensing fees on broadcasters and other telecommunication providers.

EGARA February Meeting Minutes

- The March meeting of the EGARA was called to order at 7:00 pm. A total of 14 members checked in via the 147.270 repeater.
- The Secretary's report was given and the minutes of the February on-the-air meeting can be found in the March issue Sidebands, which is available on the EGARA.club website.
- President Bryan Jackson, W2RBJ, announced that the next EGARA Club meeting will be held in-person at the Masonic Lodge, following established CDC guidelines. An email will be sent out to the membership in order to find out how many members plan to attend the April meeting,
- A donation of \$50 was received from W2UDT.
- This year's Field Day may be held at the Lodge and/or home stations. Further discussion will be held at the club's April meeting.
- Official EGARA hats have been selling briskly. A limited number are still available for purchase at \$15.
- The annual Hamfest will be held at the East Greenbush Fire Department on August 28th.
- Club liability insurance with the new carrier is now in effect.
- VE sessions will be conducted at the Search and Rescue headquarters to help its members attain their Technician license.
- The club's monthly roundtable will be conducted on the 147.270 repeater on March 24th.
- The Treasurers report was presented by Don Mayotte, KB2CDX. Profits from EGARA hat sales have been deposited in the club treasury. Financial figures will be disclosed at the April meeting. A replacement modem was purchased for the 147.270 Echolink repeater. The Echolink will hopefully be re-established by June.
- Old Business: Still awaiting lease execution for the 220 repeater site – Bryan will follow up.
- New Business: Fred, AJ4CN will conduct Technician classes beginning March 20th – the classes will run six weeks for three hours each session via ZOOM. Additional information can be obtained by contacting Fred at AJ4CN@TWC.com.
- Member ramblings: WA2WAP has put his new ACOM amplifier in service. HamShack Hotline will be featured in an upcoming Sidebands. Rusty, KD2UFC is enjoying the fair weather and putting up new antennas. "Thanks" to several members for their assistance in getting others on the HamShack Hotline. Best wishes to Fred, AJ4CN as he relocates to North Carolina. He will be missed by all of us. Ridge, KB2HWL continues to use DMR and the Hotline in very innovative ways. A Hotline roundtable is being conducted on Ext. 1394, passcode 14664. Also, a ZOOM presentation featuring Jock Elliott and the commuter net will be presented by the Albany County AREA/RACES group. Additional information can be obtained from Ridge at KB2HWL@gmail.com. Russ. WB2LXC is using the HamShack Hotline from his car.
- Chris, N2NEH has re-established his 446.150 UHF link (no tone).
- The meeting was concluded at 7:48 and the repeater was returned to normal amateur use.
- --de Steve VanSickle WB2HPR / Secretary

Tying Up Loose Ends

By Steve VanSickle, WB2HPR

Last month, we talked about transmission line basics. This month, let's wrap everything up by considering how we bring our antenna transmission lines into the shack. Much has already been written about various techniques to weatherproof connections, and strain reliefs. As you decide how to penetrate the building which houses your equipment, you may wish to think about how you can not only protect your line, but your station equipment, as well.

A very basic method may be to have a ready means of disconnecting your coax or ladder line by means of appropriate coax fittings or, in the case of wire feeders, alligator clips. This gives you the option of completely disconnecting your antenna(s) when the station is not in use, or if a storm is nearby, or you are away for an extended period. This procedure may be combined with a grounded static electricity discharge arrestor located at the point of entry to the dwelling. There are numerous devices available from your hamfest suppliers as well as on line suppliers. While this may seem a bit extreme, it doesn't take more than one lightning strike to convince one otherwise. Ask me how I know!

After a properly constructed entrance is made, consideration needs to be given as to how you will provide mechanical support to the line(s). They can be supported in numerous ways either through the use of ties, staples, clamps, clips or other usual and acceptable means to reach the station gear. This protects the lines, and prevents a safety hazard from trips!

At the station, there may be a selector switch or patch panel, which will allow the operator to change antennas to favor different frequencies (bands) or directions or polarizations. From the selector switch, you may route the transmission line to your transceiver through an antenna coupler (a/k/a Antenna Tuner) and SWR or watt meter. An antenna switch may also be integral to your tuner, this allows you to choose antennas without connecting/disconnecting coaxial jumpers - making life a whole lot easier, and saves wear and tear on cables and connectors, and reduces the likelihood that you may connect something up backwards - resulting in equipment damage!



An antenna switch makes quick work of patching your transceiver without having to manually swap coax lines



Well grounded lightning arrestors can help prevent damage to your equipment. But it's also advisable to disconnect antenna lines from your gear, especially when there's threatening weather in the forecast!

By the way - while you're at it - why not label those jumper cables to help in troubleshooting should you run into difficulty. As your station equipment evolves, proper labeling can save a lot of head scratching.

Again, it's worth mentioning that you can find some great tips at many recognized on-line resources, or through your Elmer, or in one of the many fine ARRL publications. If you have questions, there are fellow EGARA club members who will be glad to help you or discuss your options.

It is now early spring - why not take some time to check your antenna systems and make them ready for reliable and safe use throughout the year.

As always... wishing you good DX!

73!

The History of Ham Radio: Crossings III—Accolades

Chris Codella, W2PA, author, John Pelham, W1JA, editor, Phil Johnson, W2SQ, editor

(Editor's note: By special arrangement with the authors, Sidebands is pleased to present this multi-part series on the history of ham radio. Subsequent chapters will be published in future monthly editions of the newsletter)

Back in London, Coursey kidded Paul Godley about freezing up north in soggy Scotland while he and the other British hams relaxed comfortably in their warm, cozy London homes, receiving signals using small aerials. British amateurs had indeed heard many northeast US stations, and 1BCG was also heard in Holland and on a ship docked at Hamburg. Godley spent ten hours at Coursey's office documenting details of the test.

January QST's banner cover headline read: Transatlantic Tests Succeed! – followed by a list of twenty CW and six spark stations whose signals had made it across during Godley's adventures in Ardrossan. Inside, the lead article did not yet have all the details but proclaimed, "Transatlantic Tests Successful" and "WE GOT ACROSS!!!!!!"

"Excelsior!" crowed ARRL secretary Warner in his editorial as he recounted the skepticism with which an attempt at amateur transatlantic communications was met by professional communications engineers, and how certain they had been that amateurs could not possibly succeed. The feat rocked the radio community.

Warner continued:

"They had no idea it could be done – strong and steady signals night after night at a distance of three thousand miles, with an input of less than a kilowatt and the wave length two hundred meters! They're wondering today why they put in 200-kilowatt machines and miles of 500-foot towers and use wave lengths of many thousands of meters when a private citizen in his home in Podunk, Penn., with less than 50 watts of C.W. power can do the same thing."

He struck a nerve. In response, Bowden Washington, chief engineer at Independent Wireless Telegraph Co., took exception in a letter to QST. The commercial engineers, he said, were wondering no such thing and had taken aim at a different goal entirely. They spent more for higher power and big antennas to achieve reliable around-the-clock service.

However, many still suspected the original 200 meter assignment was meant to do away with amateurs. Now that they had shown what could be done, the worry might shift to others coveting what was once considered "worthless."

The identity of one of the successful transmitting stations continued to puzzle everyone. Exactly who 1AAW was—heard on spark that first night, identified on the January cover only as "Illegal Station, not yet located"—remained a mystery. Some had reported hearing the call sign locally in the Boston area, though the Roxbury, Massachusetts ham who actually held the call hadn't been on the air in over six months.

In a long article The New York Times reported the entire story of the test including the planning, procedures, and participation, and wrongly credited the actual owner of 1AAW with the first signal received. "A new era in the history of amateur wireless work will date from this achievement," the paper noted, emphasizing that low-powered instruments had surprisingly done the work of large, high powered commercial stations, probably annoying Mr. Washington and his colleagues yet again.

A second, smaller article in the same edition quoted Maxim who remarked, "It had not been thought possible by experts that amateurs could span the ocean, and we have proved that it could be done,."



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History of Ham Radio...

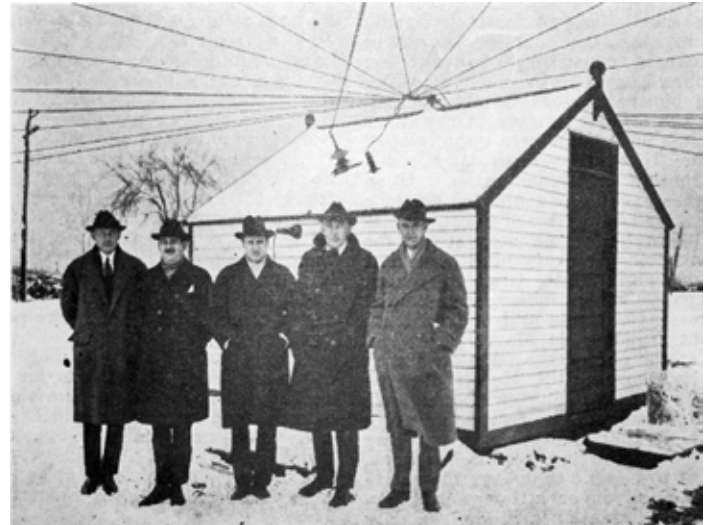
He added: "The amateur's apparatus has been developed on the basis of love for his work; it is not the perfunctory, although skillful, performance of the hired employee." The article's headline, "Maxim is Pleased with Radio Tests" indicates that he was well enough known to deserve a single-name reference in the Times.

Paul Godley's successful operation was a kind of combined contest and DXpedition. It took place outdoors in December during downpours, winds, and cold temperatures, operating on batteries from a tent heated by an oil stove and lit by an oil lantern. Winds and rain from a passing cyclone thrashed the location. "What a debt we owe Godley for what he went thru for us!" wrote Warner.

If there were still any doubts about the effectiveness of CW over spark, the transatlantics swept them aside.

The transmitting station made famous by the test was the high brain-powered, as much as RF-powered, 1BCG. Having marveled at its consistently strong and steady signals, which were far better than any of the rest, Godley and Pearson had wondered what kind of transmitter and antenna the station was using.

Constructed especially for the transatlantic test, it was described at length, first by George E. Burghard at the R.C.A. meeting at Columbia on 20 December 1921, as Godley was on his return voyage, and reprinted in QST the following February.



1BCG Designers, Builders, Operators: (L-R) Amy, Grinan, Burghard, Armstrong, Cronkhite

Because the identities of the qualifying transmitting stations had been kept secret, and since this new station was yet to be built when Godley left New York, he and Pearson had no way of knowing anything about it, other than who the call sign belonged to.

As Godley sailed for England, six R.C.A. members—Armstrong, Amy, Burghard, Cronkhite, Grinan and Inman—met on 18 November and decided to build a new station specifically to reach Godley. After considering several sites, they chose Cronkhite's station, 1BCG, in Greenwich, Connecticut and began construction the next day. Working day and night, in snow and rain, they managed to finish the antenna and its extensive ground system on 30 November, and attempted their first transmissions late that night, with "expectedly poor results," they reported.



Antenna and Station at 1BCG

Supported by two masts, 108 and 75 feet tall and 230 feet apart, the transmitting antenna was a T-vertical, in which all three sections of the T were wire "cages." It had a counterpoise radial system fanning out from the base of the feed line—there was no earth ground connection. The station being positioned at the center of it all permitted a very short lead-in connection to the transmitter. Antenna resistance measurements indicated that it was resonant near 190 meters. They were intending to work at 230 meters, which partly explained the poor first attempt.

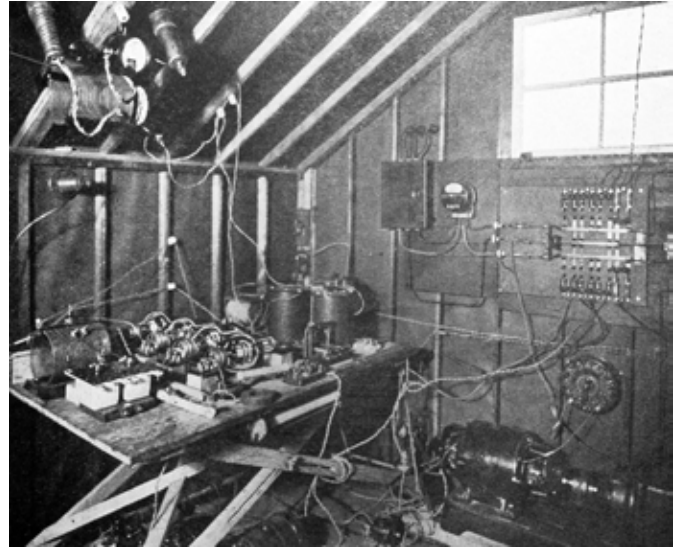
A great deal of thought went into building a transmitter that would work optimally with the superheterodyne receiver Godley would be using. They wanted to be sure the frequency was stable so that he could make use of natural resonances of the headphones and his ears! Everything about the design was to be optimized, right down to the human element in the receiving system.

History of Ham Radio...

Designing for a 1 kHz audio note in the receiver, they wanted as constant a radio frequency as possible in order to eliminate changes in audio that would be distracting to the receiving operator, or worse, make the signal inaudible. They would push the capabilities of the state of the art in 1921. But with people like Edwin Armstrong on the design team they were defining the state of the art.

“There is but one type of transmitter which can possibly meet this condition—the master-oscillator-amplifier type with a motor-generator for the plate supply,” they concluded, referring to a two-stage transmitter with a DC plate voltage produced by an AC motor driving a DC generator, instead of either a battery or a straight AC supply.

The transmitter would have a UV204 Radiotron tube for the oscillator and three more in parallel for the final amplifier with 2200 DC volts on their plates. The oscillator would run continuously, to avoid frequency variations introduced by keying it on and off, and the transmitter was keyed by two relays—one opened the grid-leak circuit disabling the amplifier stage, and the other shifted the wavelength of the oscillator by 5 meters (about 38 kHz)—in effect, FSK where the “back wave” or “back lash” component during key-up times was at greatly reduced power. The output circuit was coupled to the antenna through a fairly standard two-winding air transformer arrangement.



1BCG Station Equipment

Methodically dealing with one problem after another over the course of several days, they finally had the new transmitter up and running just past 1:00 in the morning on 9 December, which explains why Godley did not hear them at all on the first night despite conditions being so good. They measured their antenna power as 558 watts (with 990 watts input power to the tubes).

By far, the most important innovation in this transmitter was the steadiness of its transmitted frequency, which did not vary under keying or with movement of the antenna, both of which affected most other CW stations of the time. “Observation on a windy night, when the notes of all C.W. stations heard were varying so badly as to be almost unreadable, showed the frequency [of 1BCG] to be absolutely unaffected by the motion of the antenna,” they noted.

Several records were set by this station during the tests including distances of 3,800 miles to Amsterdam, 2,600 miles to California, and in message passing, a twelve-word one to Godley at Ardrossan, and three to Catalina Island, Calif.

Nearly coincident with the transatlantic tests, from 14 December to 5 January, Clifford J. Dow, 6ZAC, at Wailuku, Territory of Hawaii, had been receiving many mainland amateur stations, mostly special license stations, including a couple in the Midwest and an Army station, XF-1 at Langley Field in Virginia. Despite heavy QRN and harmonic QRM from NPM at Pearl Harbor, he also managed to copy message traffic directed to him “blind” by several West Coast stations. Dow had thus achieved something the transatlantics had not: the relaying of a routine message for a third party as part of normal ARRL relaying operations.

On the coast, 6ZR’s 1 kW spark on 375 meters in Los Angeles was the loudest arriving in Hawaii, beating even KPH, the RCA station in San Francisco; and 6ZAF, who was running 100 watts on CW was “in all over the house on two steps,” wrote Dow, referring to a detector with one or two steps of audio amplification making it audible far away from the headphones. Dow intended to build a set just like the one at 6ZAF to attempt a two-way contact.

History of Ham Radio...

In Europe, as reported by Coursey in *The Wireless World*, British amateurs had successfully received code groups from the scheduled stations and copied many other free-for-all stations. IBCG was heard by five different British amateurs. W. R. Burne, of Sale, Cheshire, heard seven stations and won the top British prizes. Coursey defended British amateurs against charges of inferior equipment being the reason for the failed earlier tests and lack of receptions prior to the December test. He attributed the success to the increased length of the tests, noting that the previous ones had run for only three days, and this time the major opening had only lasted that long. He also blamed it on the time zone difference and that British hams do not routinely stay up late (thus reinforcing their non-boiled-owl credentials). Furthermore, all the pre-war equipment in Britain had been confiscated by the government and, when returned, was mostly unfit for use, so they had to build from scratch after the war. Lastly, Godley was allowed to use a much longer antenna than is normally permitted for British amateurs.

Interest had also been high in France, where there had been some amusing confusion over Godley's messages sent via MUU, which they copied every morning. He often used phonetic words instead of letters whenever he wanted to make sure a callsign or code group made it through, especially after the "MGES" mixup. So when he said he had heard "one able yacht," the French took it to mean he heard a boat at sea. Dr. Pierre Carrot, editor of the French amateur magazine *La T.S.F. Moderne* wrote about their confusion:

"Here is a puzzle for us! A correspondent writes us 'I'll be damned if I understand anything of this mystery where rams, dogs, foxes, yachts and even X-rays play such an important part !!! might this not be a code?'"

He proceeded to explain how phonetics could be used as code for letter groups, the way "the telephone girls" do it, he wrote. Once they figured out the "system" they had no further problem with Godley's messages. But there were other words that caused confusion, such as beverage and sinkgap, which required explanation too.

French amateurs were being licensed for 100 watts of CW on 200 meters, partly resulting from the successful tests. Carrot went on to speculate about propagation effects, astonished that the short wavelengths "do carry" after all. Their scientists were at a loss to explain it, but suggested it might be due to reflection from "the higher strata of the atmosphere." Could it have been related to the moon? Based on which days signals were and were not heard, perhaps moonlight had an effect, since it was well known that "short waves are particularly sensitive to the absorbing effects of light." The full moon was on 15 December and Godley had heard nothing but "feeble signals" from the twelfth onward.

A sidebar to Godley's QST article reported that F. Clifford Estey, 1AFV, had in January succeeded in passing three messages to W. W. Burnham in London who acknowledged them by cable.

As an early supporter of the test and prize sponsor, Burnham had heard of the American plan to send Godley over to listen. After reading how only the American hams were "dyed in the wool" and could stay up to all hours listening, he had embraced and upped Warner's challenge and bet ARRL a new spring hat that Godley would not hear any American signals at all—never mind it becoming commonplace. July QST showed the ARRL secretary wearing his prize.

The hat, which was made by Harrod's, is handpainted in colors, bearing on one side the Union Jack and on the other the Stars and Stripes, united by wireless flashes which encircle the crown. Inside the hat is the inscription "From W. Witt Burnham, M.I.R.E., to Kenneth B. Warner, Secretary, A.R.R.L.," while on the front in hand-painted lettering is "In Commemoration of the Success of the Anglo-American Wireless Test organized by the A.R.R.L., 1921."

It looks rather like some versions of the lid worn by the Mad Hatter in Lewis Carroll's *Alice's Adventures in Wonderland*.



Ham Radio Satellite Returns from the Dead

After 7 years of silence, the Delfi-n3Xt satellite is again transmitting a signal. The 3U Delfi-n3Xt nanosat, launched by Delft University of Technology (TU Delft), has not been heard since 2014, and its sponsors were surprised to learn that it was transmitting again. Delfi-n3Xt carries a linear amateur radio transponder. It was the second satellite launched by TU Delft, as part of the Delfi Program, which develops very small satellites.

The first Delfi satellite, Delfi-C3, is still working as well. Now that Delfi-n3Xt is transmitting again, steps are being taken to further its mission. The Delfi-n3Xt project started in 2007, and the satellite was launched in November 2013. The satellite operated successfully for 3 months, achieving mission success. Contact with the satellite was lost in late 2014 after an experiment with the linear transponder.



When functioning properly, the Delfi-n3Xt satellite transmits telemetry on 145.870 MHz and 145.93 MHz, and high-speed data on 2405 MHz. The inverting SSB/CW transponder has an uplink passband of 435.530 - 435.570 MHz LSB and a downlink passband of 145.880 - 145.920 MHz USB. The ham transponder was a last-minute addition to the project.

On February 9, an automatic email notification was received from the satellite's ground station, indicating

that a signal from the Delfi-n3Xt had been picked up. Student and ground station operator Nils von Storch said he'd programmed the ground station software so that it would continue to track Delfi-n3Xt and notify him if it ever came back to life. Relevant checks and analysis of telemetry frames prove the satellite is transmitting again. The reason it stopped transmitting has not yet been determined, and the big question now is how it was able to resume operation. Hypotheses include a bit flip in the software or a short circuit, given the extreme conditions in space.

"Of course, in the past, we have looked for all kinds of explanations, and we also had theories about how the contact could ever come back," nanosatellite program manager Jasper Bouwmeester, PC4JB, said. "But after so long, I hadn't counted on it anymore." Bouwmeester, who has been managing the mission since 2007, expressed confidence that the satellite can still be of use to science. "But I am sure that we will be able to find solutions," operations manager Stefano Speretta said. "If we don't lose the signal again, there are interesting times ahead."

Need It Now? Grimmer's Electronics Still a Local Source for Parts

Although finding local sources for electronic parts and components is nearly impossible today, there is still one good local supplier -- Grimmer's Electronics at 41 North Brandywine Avenue in Schenectady. Parts on hand include capacitors, transistors, ICs, connectors, wire, switches, adapters, electronic tools, test equipment and much more.

The business remains in the Grimmer family and is operated by Larry Grimmer, whose father started it in 1945 on the first floor of his family's home on North Brandywine Avenue, where it remains to this day. Eventually the business took over the entire house, with the upstairs being used to store stock. Today, it is the last remaining local supplier of electronic parts, following the closure of companies such as Trojan Electronic in Troy, E.E. Taylor in Albany and the many Radio Shack stores that once dotted the area.

Grimmer's is open Monday through Friday from 8:30 am to 5 pm and can be reached at (518) 374-8480.



The Uncertain Future of Ham Radio

Software-defined radio and cheap hardware are shaking up a hobby long associated with engineering

By Julianne Pepitone, IEEE

Will the amateur airwaves fall silent? Since the dawn of radio, amateur operators—hams—have transmitted on tenaciously guarded slices of spectrum. Electronic engineering has benefited tremendously from their activity, from the level of the individual engineer to the entire field. But the rise of the Internet in the 1990s, with its ability to easily connect billions of people, captured the attention of many potential hams. Now, with time taking its toll on the ranks of operators, new technologies offer opportunities to revitalize amateur radio, even if in a form that previous generations might not recognize.

The number of U.S. amateur licenses has held at an anemic 1 percent annual growth for the past few years, with about 7,000 new licensees added every year for a total of 755,430 in 2018. The U.S. Federal Communications Commission doesn't track demographic data of operators, but anecdotally, white men in their 60s and 70s make up much of the population. As these baby boomers age out, the fear is that there are too few young people to sustain the hobby.

"It's the \$60,000 question: How do we get the kids involved?" says Howard Michel, former CEO of the American Radio Relay League (ARRL).

This question of how to attract younger operators also reveals deep divides in the ham community about the future of amateur radio. Like any large population, ham enthusiasts are no monolith; their opinions and outlooks on the decades to come vary widely. And emerging digital technologies are exacerbating these divides: Some hams see them as the future of amateur radio, while others grouse that they are eviscerating some of the best things about it.



ARRL Former ARRL CEO Howard Michel (WB2ITX) at headquarters station, W1AW.

No matter where they land on these battle lines, however, everyone understands one fact. The world is changing; the amount of spectrum is not. And it will be hard to argue that spectrum reserved for amateur use and experimentation should not be sold off to commercial users if hardly any amateurs are taking advantage of it.

Before we look to the future, let's examine the current state of play. In the United States, the ARRL, as the national association for hams, is at the forefront, and with more than 160,000 members it is the largest group of radio amateurs in the world. The 106-year-old organization offers educational courses for hams; holds contests where operators compete on the basis of, say, making the most long-distance contacts in 48 hours; trains emergency communicators for disasters; lobbies to protect amateur radio's spectrum allocation; and more.

Michel led the ARRL between October 2018 and January 2020, and he fits easily the profile of the "average" American ham: The 66-year-old from Dartmouth, Mass., credits his career in electrical and computer engineering to an early interest in amateur radio. He received his call sign, WB2ITX, 50 years ago and has loved the hobby ever since.

"When our president goes around to speak to groups, he'll ask, 'How many people here are under 20 [years old]?' In a group of 100 people, he might get one raising their hand," Michel says.

ARRL does sponsor some child-centric activities. The group runs twice-annual Kids Day events, fosters contacts with school clubs across the country, and publishes resources for teachers to lead radio-centric classroom activities. But Michel readily admits "we don't have the resources to go out to middle schools"—which are key for piquing children's interest. We need to "convince them there's more than getting licensed and putting a radio in your drawer and waiting for the end of the world."

Sustained interest is essential because potential hams must clear a particular barrier before they can take to the airwaves: a licensing exam. Licensing requirements vary—in the United States no license is required to listen to ham radio signals—but every country requires operators to demonstrate some technical knowledge and an understanding of the relevant regulations before they can get a registered call sign and begin transmitting.

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The Future of Amateur Radio...

For those younger people who are drawn to ham radio, up to those in their 30s and 40s, the primary motivating factor is different from that of their predecessors.

With the Internet and social media services like WhatsApp and Facebook, they don't need a transceiver to talk with someone halfway around the world (a big attraction in the days before email and cheap long-distance phone calls). Instead, many are interested in the capacity for public service, such as providing communications in the wake of a disaster, or event comms for activities like city marathons.

"There's something about this post-9/11 group, having grown up with technology and having seen the impact of climate change," Michel says. "They see how fragile cellphone infrastructure can be. What we need to do is convince them there's more than getting licensed and putting a radio in your drawer and waiting for the end of the world."

The future lies in operators like Dhruv Rebba (KC9ZJX), who won Amateur Radio Newsline's 2019 Young Ham of the Year award. He's the 15-year-old son of immigrants from India and a sophomore at Normal Community High School in Illinois, where he also runs varsity cross-country and is active in the Future Business Leaders of America and robotics clubs. And he's most interested in using amateur radio bands to communicate with astronauts in space.

Rebba earned his technician class license when he was 9, after having visited the annual Dayton Hamvention with his father. (In the United States, there are currently three levels of amateur radio license, issued after completing a written exam for each—technician, general, and extra. Higher levels give operators access to more radio spectrum.)

"My dad had kind of just brought me along, but then I saw all the booths and the stalls and the Morse code, and I thought it was really cool," Rebba says. "It was something my friends weren't doing."

He joined the Central Illinois Radio Club of Bloomington, experimented with making radio contacts, participated in ARRL's annual Field Days, and volunteered at the communications booths at local races.

"We want to be making an impact... The hobby aspect is great, but a lot of my friends would argue it's quite easy to talk to people overseas with texting and everything, so it's kind of lost its magic."

But then Rebba found a way to combine ham radio with his passion for space: He learned about the Amateur Radio on the International Space Station (ARISS) program, managed by an international consortium of amateur radio organizations, which allows students to apply to speak directly with crew members onboard the ISS. (There is also an automated digital transponder on the ISS that allows hams to ping the station as it orbits.)

Rebba rallied his principal, science teacher, and classmates at Chiddix Junior High, and on 23 October 2017, they made contact with astronaut Joe Acaba (KE5DAR). For Rebba, who served as lead control operator, it was a crystallizing moment. "The younger generation would be more interested in emergency communications and the space aspect, I think. We want to be making an impact," Rebba says. "The hobby aspect is great, but a lot of my friends would argue it's quite easy to talk to people overseas with texting and everything, so it's kind of lost its magic."

That statement might break the hearts of some of the more experienced hams recalling their tinkering time in their childhood basements. But some older operators welcome the change.

Take Bob Heil (K9EID), the famed sound engineer who created touring systems and audio equipment for acts including the Who, the Grateful Dead, and Peter Dinklage. His company Heil Sound, in Fairview Heights, Ill., also manufactures amateur radio technology.



Members from the LASA High School Amateur Radio Club, K5LBJ, in Austin, Texas participated in School Club Roundup, a twice-yearly on-air event that encourages participation from ham radio school groups.

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The Future of Amateur Radio...



Sateesh Nallamotheu Dhruv Rebba (KC9ZJX) with memorabilia from his ham radio contact with astronaut Joe Acaba (KE5DAR) onboard the International Space Station.

“I’d say wake up and smell the roses and see what ham radio is doing for emergencies!” Heil says cheerfully. “Dhruv and all of these kids are doing incredible things. They love that they can plug a kit the size of a cigar box into a computer and the screen becomes a ham radio.... It’s all getting mixed together and it’s wonderful.”

But there are other hams who think that the amateur radio community needs to be much more actively courting change if it is to survive. Sterling Mann (N0SSC), himself a millennial at age 27, wrote on his blog that “Millennials Are Killing Ham Radio.”

It’s a clickbait title, Mann admits: His blog post focuses on the challenge of balancing support for the dominant, graying ham population while pulling in younger people too. “The target demographic of every single amateur radio show, podcast, club, media outlet, society, magazine, livestream, or otherwise, is not young people,” he wrote. To capture the interest of young people, he urges that ham radio give up its century-long focus on person-to-person contacts in favor of activities where human to machine, or machine to machine, communication is the focus.

These differing interests are manifesting in something of an analog-to-digital technological divide. As Spectrum reported in July 2019, one of the key debates in ham radio is its main function in the future: Is it a social hobby? A utility to deliver data traffic? And who gets to decide?

Those questions have no definitive or immediate answers, but they cut to the core of the future of ham radio. Loring Kutchins, president of the Amateur Radio Safety Foundation, Inc. (ARSAFi)—which funds and guides the “global radio email” system Winlink—says the divide between hobbyists and utilitarians seems to come down to age.

“Ham radio is really a social hobby...Here in Mississippi, you get to 5 or 6 o’ clock and you have a big network going on and on—some of them are half-drunk chattin’ with you.”

“Younger people who have come along tend to see amateur radio as a service, as it’s defined by FCC rules, which outline the purpose of amateur radio—especially as it relates to emergency operations,” Kutchins (W3QA) told Spectrum last year. Kutchins, 68, expanded on the theme in a recent interview: “The people of my era will be gone—the people who got into it when it was magic to tune into Radio Moscow. But Grandpa’s ham radio set isn’t that big a deal compared to today’s technology. That doesn’t have to be sad. That’s normal.”

Gramps’ radios are certainly still around, however. “Ham radio is really a social hobby, or it has been a very social hobby—the rag-chewing has historically been the big part of it,” says Martin F. Jue (K5FLU), founder of radio accessories maker MFJ Enterprises, in Starkville, Miss. “Here in Mississippi, you get to 5 or 6 o’ clock and you have a big network going on and on—some of them are half-drunk chattin’ with you. It’s a social group, and they won’t even talk to you unless you’re in the group.”

But Jue, 76, notes the ham radio space has fragmented significantly beyond rag-chewing and DXing (making very long-distance contacts), and he credits the shift to digital. That’s where MFJ has moved with its antenna-heavy catalog of products. “Ham radio is connected to the Internet now, where with a simple inexpensive handheld walkie-talkie and through the repeater systems connected to the Internet, you’re set to go,” he says. “You don’t need a HF [high-frequency] radio with a huge antenna to talk to people anywhere in the world.”

To that end, last year MFJ unveiled the RigPi Station Server: a control system made up of a Raspberry Pi paired with open-source software that allows operators to control radios remotely from their iPhones or Web browser.

“Some folks can’t put up an antenna, but that doesn’t matter anymore because they can use somebody else’s radio through these RigPis,” Jue says. He’s careful to note the RigPi concept isn’t plug and play—“you still need to know something about networking, how to open up a port”—but he sees the space evolving along similar lines.

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The Future of Amateur Radio...

“It’s all going more and more toward digital modes,” Jue says. “In terms of equipment I think it’ll all be digital at some point, right at the antenna all the way until it becomes audio.”

The Signal From Overseas

China’s advancing technology and growing middle class, with disposable income, has led to a “dramatic” increase in operators.

Outside the United States, there are some notable bright spots, according to Dave Sumner (K1ZZ), secretary of the International Amateur Radio Union (IARU). This collective of national amateur radio associations around the globe represents hams’ interests to the International Telecommunication Union (ITU), a specialized United Nations agency that allocates and manages spectrum. In fact, in China, Indonesia, and Thailand, amateur radio is positively booming, Sumner says.

China’s advancing technology and growing middle class, with disposable income, has led to a “dramatic” increase in operators, Sumner says. Indonesia is subject to natural disasters as an island nation, spurring interest in emergency communication, and its president is a licensed operator. Trends in Thailand are less clear, Sumner says, but he believes here, too, that a desire to build community response teams is driving curiosity about ham radio.

“So,” Sumner says, “you have to be careful not to subscribe to the notion that it’s all collapsing everywhere.”

China is also changing the game in other ways, putting cheap radios on the market. A few years ago, an entry-level handheld UHF/VHF radio cost around US \$100. Now, thanks to Chinese manufacturers like Baofeng, you can get one for under \$25. HF radios are changing, too, with the rise of software-defined radio.

“It’s the low-cost radios that have changed ham radio and the future thereof, and will continue to do so,” says Jeff Crispino, CEO of Nooelec, a company in Wheatfield, N.Y., that makes test equipment and software-defined radios, where demodulating a signal is done in code, not hardwired electronics. “SDR was originally primarily for military operations because they were the only ones who could afford it, but over the past 10 years, this stuff has trickled down to become \$20 if you want.” Activities like plane and boat tracking, and weather satellite communication, were “unheard of with analog” but are made much easier with SDR equipment, Crispino says.

Nooelec often hears from customers about how they’re leveraging the company’s products. For example, about 120 members from the group Space Australia to collect data from the Milky Way as a community project. They are using an SDR and a low-noise amplifier from Nooelec with a homemade horn antenna to detect the radio signal from interstellar clouds of hydrogen.

“We will develop products from that feedback loop—like for hydrogen line detection, we’ve developed accessories for that so you can tap into astronomical events with a \$20 device and a \$30 accessory,” Crispino says.

Looking ahead, the Nooelec team has been talking about how to “flatten the learning curve” and lower the bar to entry, so that the average user—not only the technically adept—can explore and develop their own novel projects within the world of ham radio.

“It is an increasingly fragmented space,” Crispino says. “But I don’t think that has negative connotations. When you can pull in totally unique perspectives, you get unique applications. We certainly haven’t thought of it all yet.”

The ham universe is affected by the world around it—by culture, by technology, by climate change, by the emergence of a new generation. And amateur radio enthusiasts are a varied and vibrant community of millions of operators, new and experienced and old and young, into robotics or chatting or contesting or emergency communications, excited or nervous or pessimistic or upbeat about what ham radio will look like decades from now.

As Michel, the former ARRL CEO, puts it: “Every ham has [their] own perspective. What we’ve learned over the hundred-plus years is that there will always be these battles—AM modulation versus single-sideband modulation, whatever it may be. The technology evolves. And the marketplace will follow where the interests lie.”



Martin F. Jue (K5FLU), founder of well-known radio accessories maker MFJ

Shack of the Month - F1AKE

This month we venture across the pond to take a look at F1AKE -- the shack of Jean-Claude Angebaud in Nantes, France. He has been a licensed Ham since 1970 and is regularly active on both the HF and 6 meter bands. He also enjoys mentoring new Hams as an Elmer. Jean-Claude is one of three EGARA members who reside in Europe.



Jean's shack prominently displays the club's W2EGB QSL card above his transceiver.

Also on display is the QSL card of EGARA member Chris Linck, N2NEH. Chris made Jean's acquaintance several years ago during a contact on the 6 meter band during which Chris spoke to Jean in French.

They became good friends and later met in person. Chris has sponsored his club membership for many years.

The gear at F1AKE includes:

- ATLAS 210 in QRP 8/10 w + Power amplifier 250 w // same as Kenwood TS 930s operation
- In 6 m: TS 690 40 w
- In 2 m ICOM 275 = 100 w
- Antenna Dipole for 40 m 2x 10 m + MFJ 981 HUSTLER 5BTV for the 80m in DX



Let Sidebands Feature Your Shack!

Send photos and a brief description to W2RBJ@outlook.com

Late Breaking: FCC Proposes New Exam Requirements & Re-Testing of Current Amateur License Holders



Testing of new Amateur Radio operators will require additional exam elements under a proposal now being considered by the Federal Communications Commission. In addition, current hams will also be required to pass the new elements in order to retain their licenses.

The proposed changes follow a series of internal reviews by FCC staff as part of the agency's "Making Ham Radio Great Again" campaign.

The new exam elements would include a comprehensive digital modes practical test. The Commission is expected to settle on requiring FT8 proficiency -- and re-testing would be required periodically to ensure the level of competence necessary to operate in the Amateur Radio bands.

Another proposal would bring back the practical Morse Code skills requirement. While the Technician test would require only a proficiency of five words per minute, the Amateur Extra Class license would require sending code at 40 words per minute, with a 90 percent accuracy rate. Current licensees would also be re-tested to prove their code proficiency. Because the FCC no longer has Morse Code testing equipment available, exam applicants will be required to verbally send code using the traditional "dits" and "dahs" while the exam team listens to them.

Other examples of practical testing would also be introduced. One proposal would require all test applicants to make a working tri-band fan dipole antenna from zip cord in twenty minutes or less. In addition, the finished antenna would be required to operate with 100 watts of power with an SWR of under 1:1.75 on 80, 40 and 20 meters. Bonus points would be given for achieving the same SWR level on 15 and 17 meters, with Baluns optional.

Another new proposal would require all test applicants to show the ability to draw and understand electronic schematic diagrams. A Technician applicant would be required to design a simple Pitts oscillator employing a basic triode tube. For an Amateur Extra applicant, the design requirement would be expanded to include the design of a 2 meter RF converter using a suitable Field Effect Transistor (FET). An alternate tube-powered grounded-grid design would also be accepted provided it is resonant at the design frequency and its plate voltage is limited to 2.1 KV.

Also under consideration is a plan to have all prospective licensees show their ability to program an HT radio without using the manual, employing software such as CHIRP, or watching a YouTube video.

FCC officials said they believe it has become too easy for individuals to pass the current licensing tests and therefore the agency's push to institute exams that require a demonstration of actual skills related to Amateur Radio. Officials of the ARRL have voiced their complete support for the proposed changes as well.

Other significant changes under review include requiring licensees to use aluminum foil shielding to lower the spurious emissions for hand held radios that cost less than \$35 and introducing fines for operators who give inaccurate RST reports.

Under the FCC's new plan, current license holders that fail to successfully complete their re-examinations would be dropped back to the next lowest license class. For example, an Amateur Extra would be dropped to a General class ticket, and a General license holder would be downgraded to a Technician class license. In the case of Technicians who fail their re-exam, they would be demoted to Citizens Band.

The final exam element being proposed would require all current Amateur license holders, as well as new license applicants, to identify an April Fools joke when they see one.

CALENDAR

April 14, 2021 - 7 pm - Monthly club meeting - in person at Masonic Lodge. Face masks required. Bring your own refreshments.

April 28, 2021 - 7 pm - EGARA Roundtable on 147.270 repeater

August 28, 2021 - Hamfest 2021 - East Greenbush Fire Department, 68 Phillips Road.

Pro Tip: RFI Devils to Check

Getting RFI noise in your shack? Here's a couple of suspects to check.

LED strip lighting may cause RFI due to the long run of LEDs radiating any problems generated by the (often cheap) switching mode power supply.

Wrapping the supply lines around a ferrite core may help mitigate the problem.

Mobile phone & tablet chargers should also be treated with suspicion!



Looking for...

- Rens. Co. Search and Rescue is looking for a 2 meter whip for sale or donation. Needed for communications truck.
Contact Nick at kd2jcr@gmail.com

For Sale...

- Hamshack Hotline Phones - Cisco SPA-303. They are cleaned, factory reset with EGARA members # in directory. Comes with power supply. Just \$21.00 each.

Contact Dave at: WA2WAP@VERIZON.NET

- IFR-1100S Service Monitor. With Spectru
- FREE Steel Shelving:** Four (4) Steel shelves, never used, size approx.. 16 x 36 in. About 3/4 in thick. Removed from a new office storage cabinet. Powder coated - black Matte finish. Also - several sheets of pegboard. Can easily be cut for easy transport - in good shape, brown color, unfinished. Use 'em to hand stuff in your workshop or shed. All for FREE!

- Arrow Model 52-S4** - 4-Element 6 Meter Yagi antenna in good condition. \$75.00

For above contact Steve at: svansick@nycap.rr.com

- IFR-1100S Service Monitor. With Spectrum Analyzer and Oscilloscope. Tested and Calibrated last year. AM - FM, CTCSS Generator, VGC. \$875.00
- Military Watt Meter AN/URM-120 B/U 2 to 1000 MHZ Complete with Carrying Case. In EC. \$90.00
- Yaesu FT-2900 Programing Software by RT Systems Cable included. Registered, includes password. \$29.00
- UHF RX Amp, 1 input 3 outputs. 12V. SO-239s \$10
- HF 440 Mhz Fast Scan TV Transceiver including B&W Camera. \$65
- Several old desktop and mini notebook computers good for projects. Good deals!

For above, contact John at: radiowizz@aol.com

- Price Drop! Ameritron 811 Amplifier with latest updates. Worn parts replaced. Does not include tubes. Now \$400.
Contact: wo2h@nycap.rr.com or phone 518-860-4971

Got stuff to sell, swap, or looking to buy?

List it here for FREE!

Email W2RBJ@outlook.com

The East Greenbush Amateur Radio Association

Organized in 1998, by Bert Bruins, N2FPJ, (SK) and Chris Linck, N2NEH, the East Greenbush Amateur Radio Association, an ARRL affiliate, is committed to providing emergency services, educational programs, and operating resources to amateur radio operators and residents of the Capital Region of New York State. The club station is W2EGB. The club also has several VHF and UHF repeaters open to club members and the public.